

Assignment 10.3 Questions 2, 3, 6, 7, 9, 11, 14, 15, 19, 28

- 2) a. No, any water molecules that gain enough energy by chance will continue to evaporate.
b. This one is just dumb.
c. No, water will evaporate anyway, but will eventually reach equilibrium.
d. Yes, water continues to evaporate, but eventually the rate of condensation will equal the rate of evaporation (equilibrium.)
e. No, water will continue to evaporate, but will also condense so it will not all reach the gas phase.
- 3) Running cool water over the neck causes water to condense on the inside of the neck, thus decreasing the pressure of water vapor. When this happens, the rate of vaporization is greater than the rate of condensation.
- 6) Liquids have vapor pressure because molecules have a wide range of kinetic energies. Temperature is only the average. By chance, some molecules attain enough energy to break free of the intermolecular forces. Solids do exhibit vapor pressure for the same reason, but it requires more energy, so it is more rare. This is an example of sublimation.
Increased temperature causes increased vapor pressure.
- 7) The vapor pressure stays the same at a constant temperature.
- 9) *Phase diagrams are no longer part of the AP Chem curriculum*
- 11) Water evaporates because some molecules attain sufficient energy to break free of the hydrogen bonds. This is thermodynamically favorable as it increases entropy.
- 14) *Phase diagrams are no longer part of the AP Chemistry curriculum.*
- 15) As liquids evaporate, only the particles with the most kinetic energy are able to escape. This means the average kinetic energy of the remaining particles is decreased. Since temperature has gone down, it will draw heat from the surroundings. Thus evaporation is an endothermic process.
- 19) a. greater intermolecular forces = slower rate of evaporation
b. increased temperature = faster rate of evaporation
c. increased surface area = greater rate of evaporation
- 23) All 3 will have similar London dispersion forces. However, one substance might have hydrogen bonding, another dipole-dipole forces, and the last one could be completely non-polar.